VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260. The proposed discharge will result from the operation of a municipal sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
   Boyce STP
   Clarke County Sanitary Authority
   PO Box 327
   Berryville, VA 22611
   Location: 125 East Main Street, Boyce, VA 22620

2. Permit No. VA0085171; Expiration Date: September 30, 2015

3. Owner: Clarke County Sanitary Authority
   Contact Name: Mike Legge
   Title: Administrator
   Telephone No: (540) 955-5185
   Email: mlegge@clarkecounty.gov

4. Description of Treatment Works Treating Domestic Sewage:
   Total Number of Outfalls: 1

   The facility serves commercial and municipal wastewater sources within the Boyce service area. The treatment units comprising the recently upgraded STP are shown in the schematics included in the permit reissuance application.

   Average Discharge Flow (February 2014 – January 2015) = 0.048 MGD
   Design Average Flow = 0.099 MGD

5. Application Complete Date: April 2, 2015

   Permit Writer: Dawn Jeffries Date: June 15, 2015
   Reviewed By: Bev Carver Date: June 17, 2015

   Public Comment Period:

6. Receiving Stream Name: Roseville Run
   River Mile: 1.38
   Use Impairment: Yes
   Special Standards: pH
   Tidal Waters: No
   Watershed Name: VAN – B57R Shenandoah River/Spout Run
   Basin: Potomac; Subbasin: Shenandoah
   Section: 1c; Class: VI

7. Operator License Requirements per 9VAC25-31-200.C: Class III

8. Reliability Class per 9VAC25-790: Class II (assigned October 9, 1990)

9. Permit Characterization:
   ☐ Private ☐ Federal ☐ State ☑ POTW ☐ PVOTW
   ☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9VAC25-260-30:
Tier Designation: Tier 1

    The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

    The AD review begins with a Tier determination. Roseville Run downstream of the discharge location is determined to be a Tier 1 water. This determination is based on the fact that the facility discharges to a segment that is listed as impaired for temperature, and because the receiving stream has been fully allocated for Ammonia-N. The receiving stream is also listed as impaired for bacteria; however, bacteria impairment is not used as a sole basis for classifying a receiving stream is Tier 1. Antidegradation baselines are not calculated for Tier 1 waters.

12. Site Inspection: Performed by Dawn Jeffries on April 15, 2015

13. Effluent Screening and Effluent Limitations: Appendix B

14. Effluent toxicity testing requirements included per 9VAC25-31-220.D: ☐Yes ☑ No
This municipal facility does not have a design flow $\geq$ 1.0 MGD, has no Significant Industrial Users (SIUs) or Categorical Industrial Users (CIUs), and is not deemed to have the potential to cause or contribute to instream toxicity.

15. Sludge Management Plan (SMP): The VPDES permit application serves as the SMP and is approved with the reissuance of the permit. Sewage sludge utilization and disposal options include the following: dewatered sewage sludge is hauled to Frederick County Landfill in Winchester, Virginia for disposal.

16. Bases for Special Conditions: Appendix C

17. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

18. Antibacksliding Review per 9VAC25-31-220.L: This permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

19. Impaired Use Status Evaluation per 9VAC25-31-220.D: Roseville Run is listed as impaired for bacteria and temperature. In addition, the TMDL for Spout Run includes the following WLAs for bacteria and sediment for this facility:

    E. coli: 8.70×10^{10} cfu/yr (based on a design flow of 0.050 MGD and a concentration of 126 cfu/100 mL)
    Sediment: 2.07 metric tonnes/yr (based on a design flow of 0.050 MGD and a concentration of 30 mg/L)

    The permit contains a re-opener condition that may allow the permit limits to be modified, in compliance with section 303(d)(4) as necessary.

20. Regulation of Users per 9VAC25-31-280.B.9: N/A – This facility is owned by a municipality.

21. Storm Water Management per 9VAC25-31-120: Application Required? ☐ Yes ☑ No
    This facility does not have a design flow ≥ 1.0 MGD, nor is it required to have an approved POTW pretreatment program under 9VAC25-31-10 et seq.

22. Compliance Schedule per 9VAC25-31-250: There are no compliance schedules included in the reissued permit.

23. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.K, and 100.N: The permittee has requested waivers from sampling and reporting fecal coliform and temperature as part of the application. The waiver requests have been approved based on the justification provided by the permittee.

24. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility is owned by a municipality.

25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☑ No

26. Nutrient Trading Regulation per 9VAC25-820: See Appendix B
    General Permit Required: ☑ Yes ☐ No

27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☑ No
    This facility is actively monitoring and reporting under the Nutrient General Permit. This permit does not include any outfalls that discharge solely stormwater exposed to industrial activity.

28. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows, T&E screening is not automatically required. However, in accordance with the VPDES Memorandum of Understanding, T&E screening was coordinated on March 31, 2015 through DCR based upon request. Comments were received from DCR on April 29, 2015 and are included in the permit processing file. Comments were considered in the drafting of the permit and were also forwarded to the permittee.

29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Dawn Jeffries at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7898, dawn.jeffries@deq.virginia.gov.

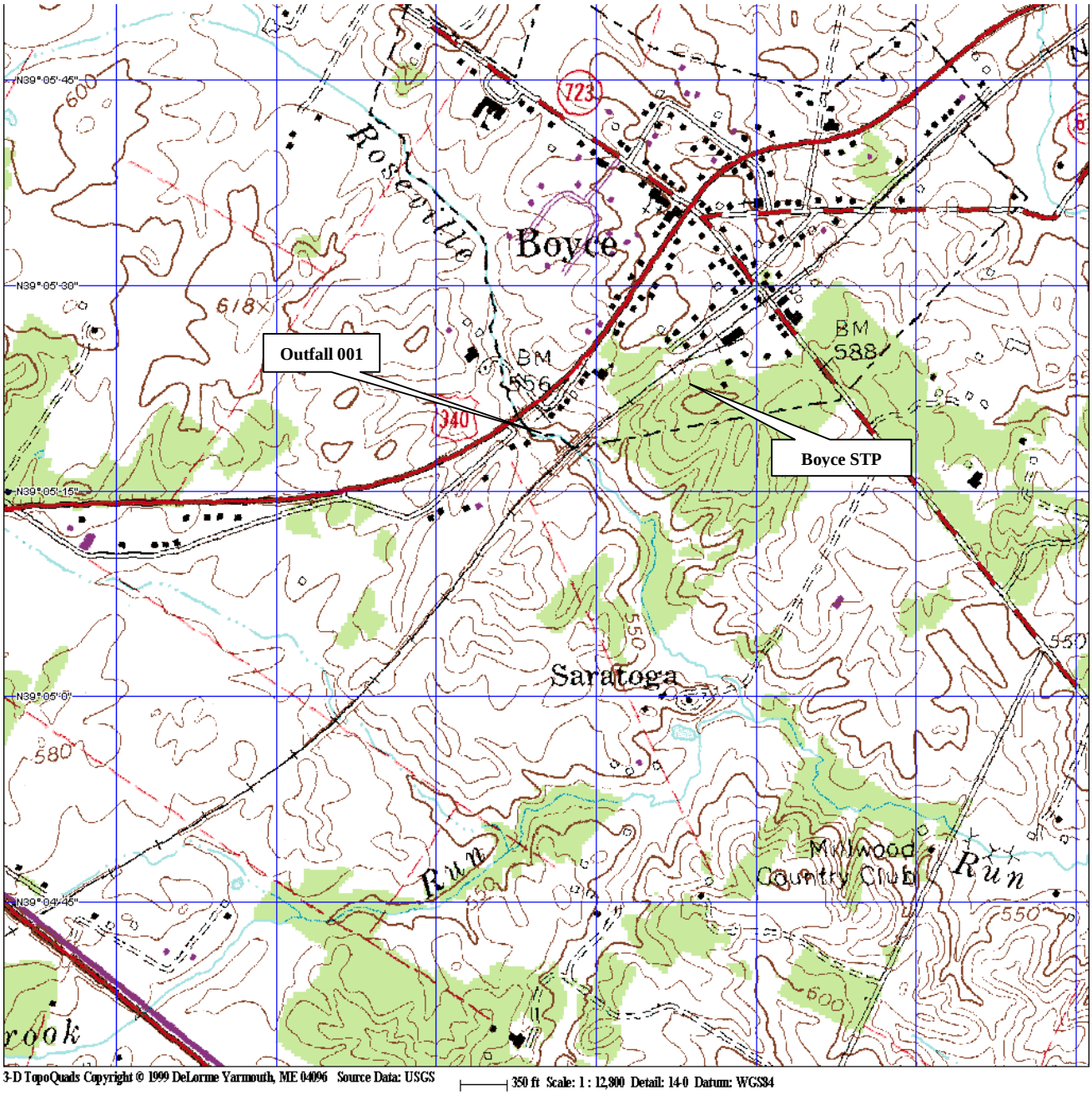
    Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

30. Historical Record: On October 19, 1990, VPDES Permit No. VA0085171 was issued for a proposed 0.050 MGD STP to serve the Town of Boyce and discharge directly to Roseville Run. An additional design flow tier of 0.099 MGD was included in the permit reissued in 2005, and the final CTO for that expansion flow was issued on June 18, 2010; therefore the 0.050 MGD and 0.75 MGD flow tiers were removed at the 2010 reissuance.

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

The facility discharges to Roseville Run in Clarke County. The topographical map below shows the location of the treatment facility and Outfall 001.



PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessments Review table below.

WATER QUALITY ASSESSMENTS REVIEW
POTOMAC-SHENANDOAH RIVER BASIN
3/12/2015

IMPAIRED SEGMENTS

SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER
B32R-02-HG	South River/NF Shenando	163.27	8.16	155.11	Mercury in Fish Tissue
B41R-02-PCB	SF Shenandoah River/NF	51.1	0.00	51.1	PCB in Fish Tissue
B57R-01-BAC	Page Brook Run/Spout Ru	8.78, 3.70	0.00, 0.00	8.78, 3.70	Fecal Coliform
B57R-01-BEN	Spout Run	3.7	0.00	3.7	Benthic
B57R-02-BAC	Long Branch	3.63	0.00	3.63	Fecal Coliform, E-coli
B57R-03-BAC	Chapel Run	9.44	0.00	9.44	E-coli
B57R-03-BEN	Chapel Run	9.44	0.00	9.44	Benthic
B57R-04-BAC	Roseville Run	3.94	0.00	3.94	E-coli
B57R-04-TEMP	Roseville Run	3.94	0.00	3.94	Temperature
B58R-02-BAC	Dog Run	4.8	0.00	4.8	E-coli

PERMITS

PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0085171	**Boyce STP**	**Roseville Run**	**1.38**	**390519**	**0780351**	**VAV-B57R**
VA0058599	Berryville WTP	Lewis Run	1.00	390609	0775903	VAV-B57R
VA0090883	Prospect Hills Filtration W	Page Brook	0.83	390519	0780233	VAV-B57R

MONITORING STATIONS

STREAM	NAME	RIVER MILE	RECORD	LAT	LONG
Chapel Run	1BCPL000.95	0.95	11/14/03	390509	0775914
Dog Run	1BDGR000.23	0.23	7/16/68	390619	0775524
Dog Run	1BDGR000.47	0.47	7/16/68	390809	0775720
Dog Run	1BDGR003.91	3.91	5/4/72	390810	0775730
Dog Run	1BDGR004.02	4.02	5/4/72	390814	0775736
Long Branch	1BLNG000.24	0.24	5/11/01	390130	0780130
Page Brook	1BPGE000.09	0.09	5/10/01	390441	0780241
Roseville Run	1BRSC001.42	1.42	7/1/98	390518	0780351
Shenandoah River	1BSHN032.65	32.65	5/13/10	390445	0775912
Shenandoah River	1BSHN038.48	38.48	9/23/99	390228	0775958
Shenandoah River	1BSHN038.27	38.27	9/19/67	390228	0775752
Shenandoah River	1BSHN028.15	28.15	7/27/05	390606	0775755
Spout Run	1BSPR000.40	0.4	7/1/91	390357	0780013
Venus Branch	1BVNS000.34	0.34	5/11/01	390010	0780309
Chapel Run	1BCPL002.83	2.83	8/29/01	390611	0780040
Shenandoah River	1BSHN037.23	37.23	6/2/08	390324	0775919

PUBLIC WATER SUPPLY INTAKES

OWNER	STREAM	RIVER MILE
BERRYVILLE, TOWN	SHENANDOAH RIVER	25.26

WATER QUALITY MANAGEMENT PLANNING REGULATION

Is this discharge addressed in the WQMP regulation? **No**

If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?

PARAMETER	ALLOCATION

WATERSHED NAME

VAV-B57R Shenandoah River/Spout Run

FLOW FREQUENCY DETERMINATION

The VDEQ conducted several flow measurements on Roseville Run from 1995 to 2000. The measurements were made above the Boyce STP outfall. The measurements were correlated with the same-day daily mean values from the continuous record gage on Passage Creek near Buckton, VA (#01635500). The period of record for the gage is from 1932 to present. The correlation was done by plotting the measurements and the daily mean values on a log/log graph, and performing a regression analysis. The measurements correlated well with the Passage Creek gage (Multiple R = 0.96). A best-fit line through the plotted measurements was established. The required flow frequencies for Roseville Run at the Boyce STP discharge point were then calculated using the equation for the line's y-intercept and the flow frequencies for the entire period of record of the Passage Creek gage. The flow frequencies for the Passage Creek gage and the calculated flow frequencies for the measurement site/discharge point are presented below:

Passage Creek near Buckton, VA (#01635500):

Drainage Area = 86.5 mi^2

1Q30 =	0.58 cfs	High Flow 1Q10 =	5.91 cfs
1Q10 =	1.12 cfs	High Flow 7Q10 =	7.11 cfs
7Q10 =	1.40 cfs	High Flow 30Q10 =	12.4 cfs
30Q10 =	2.09 cfs	HM =	11.3 cfs
30Q5 =	2.72 cfs		

Roseville Run above Boyce STP at Boyce, VA (#01636295):

Drainage Area = 2.38 mi^2

1Q30 =	0.017 cfs	(0.011 mgd)	High Flow 1Q10 =	0.144 cfs	(0.093 mgd)
1Q10 =	0.031 cfs	(0.020 mgd)	High Flow 7Q10 =	0.170 cfs	(0.11 mgd)
7Q10 =	0.038 cfs	(0.025 mgd)	High Flow 30Q10 =	0.284 cfs	(0.18 mgd)
30Q10 =	0.055 cfs	(0.036 mgd)	HM =	0.261 cfs	(0.17 mgd)
30Q5 =	0.071 cfs	(0.046 mgd)			

The high flow months are January through May.

The analysis assumes that there are no significant discharges, withdrawals, or springs that may influence the flow in Roseville Run upstream of the discharge point.

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

Annual

Effluent Flow = 0.099 MGD
Stream 7Q10 = 0.025 MGD
Stream 30Q10 = 0.036 MGD
Stream 1Q10 = 0.020 MGD
Stream slope = 0.004 ft/ft
Stream width = 4.0 ft
Bottom scale = 5
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2411 ft
Length = 29.99 ft
Velocity = .199 ft/sec
Residence Time = .0017 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2543 ft
Length = 28.57 ft
Velocity = .2054 ft/sec
Residence Time = .0016 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2349 ft
Length = 30.7 ft
Velocity = .196 ft/sec
Residence Time = .0435 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Wet Season

Effluent Flow = 0.099 MGD
Stream 7Q10 = 0.11 MGD
Stream 30Q10 = 0.18 MGD
Stream 1Q10 = 0.093 MGD
Stream slope = 0.004 ft/ft
Stream width = 4.3 ft
Bottom scale = 5
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .3188 ft
Length = 27.01 ft
Velocity = .2359 ft/sec
Residence Time = .0013 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .3829 ft
Length = 22.8 ft
Velocity = .2622 ft/sec
Residence Time = .001 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .301 ft
Length = 28.54 ft
Velocity = .2287 ft/sec
Residence Time = .0347 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

SITE VISIT

On April 15, 2015 the writer performed a site visit at the subject facility. The following photos show the stream at the discharge point and at a downstream bridge.

Outfall 001

Outfall 001 Downstream View

Outfall 001 Upstream View

Downstream below Railroad Trestle

APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001 **Final Limits** **Design Flow: 0.099 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
---	---	Monthly Average		Weekly Average		---	---
$CBOD_5$ (Jun-Dec)	3,4	6 mg/L	2 kg/d	8 mg/L	3 kg/d	1/2 Months	4 HC
$CBOD_5$ (Jan-May)	3,4	20 mg/L	7.5 kg/d	30 mg/L	11 kg/d	1/2 Months	4 HC
TSS	5	15 mg/L	5.6 kg/d	22 mg/L	8.2 kg/d	1/Month	4 HC
Ammonia-N (Jun-Dec)(mg/L)	3	2.8		4.0		1/2 Months	4 HC
Ammonia-N (Jan-May)(mg/L)	3	5.9		8.7		1/2 Months	4 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.0094		0.011		3/Day	Grab
Chloride (mg/L)	6	NL		NL		1/6 Months	4HC
E. coli (N/100 mL) (geometric mean)	5	63		NA		4/Month in any month of each calendar year* or 4/Month** 10 am to 4 pm	Grab
---	---	Annual Average		Maximum		---	---
TP – Year to Date (mg/L)	7	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	7,8	1.0		NA		1/Year	Calculated
TN – Year to Date (mg/L)	7	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	7,8	8.0		NA		1/Year	Calculated
---	---	Minimum		Maximum		---	---
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.3		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,6	1.0		NA		3/Day	Grab

NL = No Limitation, monitoring required; NA = Not Applicable; TIRE = Totalizing, Indicating, and Recording Equipment; 4 HC = 4-Hour Composite
3/Day = 3 samples taken daily at 4 hour intervals
4/Month = 4 samples taken monthly, with at least 1 sample taken each calendar week
4/Month in any month of each calendar year = 4 samples taken, with at least 1 sample taken each calendar week, in any calendar month and reported with the December DMR due January 10th of every year
1/2 Months = Every other month sampling with the results submitted with DMRs due January 10th, March 10th, May 10th July 10th, September 10th, and November 10th of each year
1/6 Months = Semiannual sampling (January 1 – June 30 and July 1 – December 31) with the results submitted with the DMR due January 10th and July 10th of each year
1/Year = Annual sampling with the results submitted with the DMRs due January 10th of each year

* = *Applicable only when chlorination is used for disinfection*
** = *Applicable if an alternative to chlorination is used for disinfection.*

BASIS DESCRIPTIONS

1. *VPDES Permit Regulation (9VAC25-31)*
2. *Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)*
3. *Water Quality Standards (9VAC25-260)*
4. *Regional Stream Model Simulation*
5. *Spout Run Watershed Bacteria and Sediment TMDL; approved June 2010*
6. *Best Professional Judgment (BPJ)*
7. *GM No. 07-2008, Amendment No. 2, 10/23/07, Permitting Considerations for Facilities in the Chesapeake Bay Watershed*
8. *Annual average concentration limits are based on the Technology Regulation (9VAC25-40)*

LIMITING FACTORS – OVERVIEW:
The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9VAC25-720)	
A. TMDL limits	**E. coli, Sediment**
B. Non-TMDL WLAs	**None**
C. CBP (TN & TP) WLAs	**TN and TP via GP VAN010107**
Federal Effluent Guidelines	**$CBOD_5$, TSS, pH**
BPJ/Agency Guidance limits	**TRC (contact)**
Water Quality-based Limits - numeric	**$CBOD_5$, DO, TRC (effluent), E. coli, pH, Ammonia-N, Chloride**
Water Quality-based Limits - narrative	**None**
Technology-based Limits (9VAC25-40-70)	**TN, TP**
Whole Effluent Toxicity (WET)	**None**
Storm Water Limits	**Not Applicable**

EVALUATION OF THE EFFLUENT – FEDERAL EFFLUENT GUIDELINES (FEGs) FOR SECONDARY TREATMENT: 40 CFR PART 133.102:

The 30-day average for BOD_5 and TSS shall not exceed 30 mg/L.
The 7-day average for BOD_5 and TSS shall not exceed 45 mg/L.
The pH must be in the range of 6.0 – 9.0 SU.

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:
During the previous reissuance, the discharge for this facility was modeled using the Regional Stream Model (v 4.11) for annual and wet seasons. The discharge was remodeled at this reissuance to reflect updated stream conditions. The modeling information is available for review at the DEQ-Valley Regional Office or electronically upon request. The values shown below are protective of the instream DO WQS for Class VI waters of 7.0 mg/L:

	Annual	Wet Season
$CBOD_5$ (mg/L)	5.5	20
TKN (mg/L)	5.1	10.5
DO (mg/L)	7.3	7.3

$CBOD_5$:
The annual $CBOD_5$ limits have been carried forward from the previous permit. The wet season $CBOD_5$ limits are more stringent than the previous limits based on current stream flow data; however, no compliance schedule has been included because there are data to indicate that the limits can be consistently met. The $CBOD_5$ limits were calculated as follows:

Annual Season (Jun – Dec):
Monthly Average:
5.5 mg/L was used in regional office model. Since the modeled $CBOD_5$ is ‹ 10 mg/L, one digit is used to establish the permit limit. Using the significant figures guidance, 5.5 mg/L is rounded to 6 mg/L.
Monthly Average loading limits: (5.5 mg/L)(0.099 MGD)(3.785) = 2.1 kg/d, round to 2 kg/d.

Weekly Average:
The modeled $CBOD_5$ is multiplied by 1.5 to calculate the maximum weekly average as follows:
(5.5 mg/L)(1.5) = 8.25 mg/L, round to 8 mg/L
Weekly Average loading limits (8.25 mg/L)(0.099 MGD)(3.785) = 3.1 kg/d, round to 3 kg/d

Wet Season (Jan – May):
Monthly Average: 20 mg/L
Monthly Average loading limit: (20 mg/L)(0.099 MGD)(3.785) = 7.49 kg/d, round to 7.5 kg/d

Weekly Average:
The modeled $CBOD_5$ is multiplied by 1.5 to calculate the maximum weekly average as follows:
(20 mg/L)(1.5) = 30 mg/L
Maximum Weekly Average loading limit:
(30 mg/L)(0.099 MGD)(3.785) = 11.2 kg/d, round to 11 kg/d

The permittee has requested a reduction in monitoring frequencies for $CBOD_5$ (Jan-May) and $CBOD_5$ (Jun-Dec). The facility has had no compliance or enforcement problems in the past three years and is therefore eligible for this reduction. In addition, the effluent data have been considered. As specified in Guidance Memo No. 14-2003, the following procedures were used in the monitoring reduction analysis. The three-year average of data for each season was calculated. The average values were compared with the permit limits for each parameter and with the information in the table on page MN-2 of Guidance Memo No. 14-2003 to determine the potential monitoring frequency reduction. The average $CBOD_5$ (Jan-May) concentration for the past three years is 0.20 mg/L and the permit limit is 20 mg/L. The average $CBOD_5$ (Jun-Dec) concentration for the past three years is 0.50 mg/L and the permit limit is 6 mg/L. Because the ratio of the average effluent concentration to the monthly average permit limit in each case was less than 25%, the monitoring frequencies in the previous permit have been reduced from 1/Week to 1/2 Months.

The permittee is expected to take all appropriate measures to control both the average level of pollutants of concern in the discharge as well as the variability of such parameters in the discharge, regardless of any reductions in monitoring frequencies granted from the baseline levels. A special condition has been included in the permit that requires increased monitoring for Ammonia-N and $CBOD_5$ if the facility is issued a Notice of Violation for either parameter.

DO:
The DO limit has been carried forward from the previous permit.

TKN:
The model used TKN values which are more than twice the Ammonia-N WLAc. Based on the model results, it was determined that no TKN limits were needed because the Ammonia-N limits imposed in this permit will control TKN.

pH:
The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit.

TSS
The TSS limits have been carried forward from the previous permit and are consistent with the Sediment TMDL WLA as shown below:

The Spout Run Sediment TMDL of 2.07 metric tonnes/year converts to the monthly average limit of 5.6 kg/d as follows:
2,070 kg/yr ÷ 365 days/yr = 5.67 kg/d, round down to 5.6 kg/d to comply with TMDL

Monthly Average limit: 5.6 kg/d
Monthly average concentration limit: ((5.6 kg/d) / 3.785)/0.099 MGD = 14.94 mg/L, round to 15 mg/L

Weekly Average limits:
The maximum weekly average concentration limits are calculated as 1.5 times the monthly average limits as follows:
(15 mg/L)(1.5) = 22.5 mg/L, round to 22 mg/L
Weekly Average loading limits: (22 mg/L)(0.099 MGD)(3.785) = 8.2 kg/d

EVALUATION OF THE EFFLUENT – DISINFECTION:

The E. coli limits have been carried forward from the previous permit. The TMDL WLA of 8.70 X 10^{10} cfu/yr for E. coli is based on a flow of 0.05 MGD. Because the current design flow of the facility is 0.099 MGD, the E. coli concentration limits were adjusted downward to maintain compliance with the TMDL WLA. The E. coli limits are consistent with the TMDL WLA of 8.70×10^{10} cfu/yr and are protective of the current WQS for E. coli in the receiving stream.

The monitoring frequency of 1/Week has also been carried forward (applied as 4/Month) based on compliance history and permittee request. Although the receiving stream is listed as Class VI, the additional designators 'i' or 'ii' do not apply; therefore, the halogen ban does not apply. Chlorine limits are also specified in the permit, but are only applicable should the facility utilize chlorine disinfection. If chlorine disinfection is used, E. coli monitoring is required 4/Month in one month of each calendar year to further demonstrate adequate disinfection.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with § 62.1-44.19:14.C.5. of the Code of Virginia, this discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for TN and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) (GP). The load limit for TN is 2,848 pounds per calendar year and TP is 381 pounds per calendar year.

The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed (9VAC25-40-70) stipulates the inclusion of technology-based effluent concentration limits in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade. Technology based annual average effluent concentration limits of TN = 8.0 mg/L and TP = 1.0 mg/L have been included in the permit. At these annual average concentrations and design flows, the load limits will be met without the need to offset any nutrient loads.

EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1BSPR000.40 on Spout Run at the Rte 621 Bridge in Clarke County. The "Wet Season" or "High Flow" months are January through May.

Stream Information			
90% Annual Temp (°C) =	19.2	90% pH (SU) =	8.3
90% Wet Temp (°C) =	15.3	10% pH (SU) =	7.7
Mean Hardness (mg/L) =	268		

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH values were obtained from the daily operational data submitted by the permittee. Because no new temperature data were available, the values utilized in the previous reissuance have been carried forward. The hardness value was obtained from permittee monitoring done during the current permit term.

Effluent Information			
90% Annual Temp (°C) =	22.0	90% pH (SU) =	8.0
90% Wet Temp (°C) =	17.6	10% pH (SU) =	7.6
Mean Hardness (mg/L) =	333		

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- TRC: More stringent limits were determined to be necessary. This change is due to decreased stream receiving stream flows. This facility currently uses UV disinfection, so no compliance schedule has been included to meet the more stringent limits.

- Ammonia-N: Less stringent Ammonia-N limits have been determined to be necessary due to a decreased effluent 90th percentile pH. Because new effluent data are available which would have justified the less stringent limits when the previous limits were established, had that information been available, the less stringent and seasonal Ammonia-N limits comply with the antibacksliding provisions of the VPDES Permit Regulation.

  The permittee has requested a reduction in monitoring frequencies for Ammonia-N (Jan-May) and Ammonia-N (Jun-Dec). The facility has had no compliance or enforcement problems in the past three years and is therefore eligible for this reduction. In addition, the effluent data have been considered. As specified in Guidance Memo No. 14-2003, the following procedures were used in the monitoring reduction analysis. The three-year average of data for each parameter was calculated. The average values were compared with the permit limits for each parameter and with the information in the table on page MN-2 of Guidance Memo No. 14-2003 to determine the potential monitoring frequency reduction. The average Ammonia-N (Jan-May) concentration for the past three years is 0.122 mg/L and the permit limit is 5.9 mg/L. The average Ammonia-N (Jun-Dec) concentration for the past three years is 0.186 mg/L and the permit limit is 2.8 mg/L. Because the ratio of the average effluent concentration to the monthly average permit limit in each case was less than 25%, the monitoring frequencies in the previous permit have been reduced from 1/week to 1/2 Months. The permittee is expected to take all appropriate measures to control both the average level of pollutants of concern in the discharge as well as the variability of such parameters in the discharge, regardless of any reductions in monitoring frequencies granted from the baseline levels. A special condition has been included in the permit that requires increased monitoring for Ammonia-N and $CBOD_5$ if the facility is issued a Notice of Violation for either parameter.

- Monitoring data is needed for the pollutants listed in Attachment A. The permittee must monitor the effluent at Outfall 001 for the substances noted in Attachment A of the permit once after the start of the third year from the permit's effective date.

- Antimony: No limits were determined to be necessary when the effluent data were compared directly to the Human Health WLAs.

- Chloride: No limits were determined to be necessary based on data since the recent resetting of automatic controls for ferric chloride addition for phosphorus removal. Although no limits were included on the permit, chloride monitoring has been included. Since the receiving stream is small, and the effluent is known to contain chloride at levels that could change over time, 1/6 Months monitoring has been required.

WQC-WLA SPREADSHEET INPUT

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name: Boyce STP
Receiving Stream: Roseville Run
Permit No.: VA0085171
Date: 6/29/2015
Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information			Effluent Information	
Mean Hardness (as CaCO3) =	268 mg/L	1Q10 (Annual) =	0.020 MGD	Annual	- 1Q10 Flow =	100 %	Mean Hardness (as CaCO3) =	333 mg/L
90% Temperature (Annual) =	19.2 deg C	7Q10 (Annual) =	0.025 MGD		- 7Q10 Flow =	100 %	90% Temp (Annual) =	22.0 deg C
90% Temperature (Wet season) =	15.3 deg C	30Q10 (Annual) =	0.036 MGD		- 30Q10 Flow =	100 %	90% Temp (Wet season) =	17.6 deg C
90% Maximum pH =	8.3 SU	1Q10 (Wet season) =	0.093 MGD	Wet Season	- 1Q10 Flow =	100 %	90% Maximum pH =	8 SU
10% Maximum pH =	7.7 SU	30Q10 (Wet season) =	0.18 MGD		- 30Q10 Flow =	100 %	10% Maximum pH =	7.6 SU
Tier Designation =	1	30Q5 =	0.046 MGD				Current Discharge Flow =	0.09900 MGD
Public Water Supply (PWS) Y/N? =	N	Harmonic Mean =	0.17 MGD				Discharge Flow for Limit Analysis =	0.09900 MGD
V(alley) or P(iedmont)? =	V							
Trout Present Y/N? =	Y							
Early Life Stages Present Y/N? =	Y							

Footnotes:

1. All concentrations expressed as micrograms/ liter (ug/ l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/ l CaCO3. Standards calculated using Hardness values in the range of 25-400 mg/ l CaCO3.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQSs selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation (based on standards).
10. WLA = Waste Load Allocation (based on standards).
11. WLAs are based on mass balances (less background, if data exist).
12. Acute - 1 hour avg. concentration not to be exceeded more than 1/ 3 years.
13. Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/ 3 years.
14. Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
15. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQC-WLA SPREADSHEET OUTPUT

Facility Name: Boyce STP
Permit No.: VA0085171
Receiving Stream: Roseville Run
Date: 6/29/2015

WATER QUALITY CRITERIA
0.099 MGD Discharge Flow - Mix per "Mixer"

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS
0.099 MGD Discharge - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health Public Water Supplies	Human Health Other Surface Waters	Aquatic Protection Acute	Aquatic Protection Chronic	Human Health
Ammonia-N (Annual)	N	5.2E+00 mg/L	1.4E+00 mg/L	None	None	6.3E+00 mg/L	2.0E+00 mg/L	N/A
Ammonia-N (Wet Season)	N	4.5E+00 mg/L	1.7E+00 mg/L	None	None	8.7E+00 mg/L	4.8E+00 mg/L	N/A
Antimony	N	None	None	5.6E+00	6.4E+02	N/A	N/A	9.4E+02
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	4.1E+02	1.9E+02	N/A
Cadmium	N	1.5E+01	2.8E+00	5.0E+00	None	1.8E+01	3.5E+00	N/A
Chloride	N	8.6E+02 mg/L	2.3E+02 mg/L	2.5E+02 mg/L	None	1.0E+03 mg/L	2.9E+02 mg/L	N/A
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.3E-02 mg/L	1.4E-02 mg/L	N/A
Chromium (+3)	N	1.5E+03	1.9E+02	None	None	1.8E+03	2.4E+02	N/A
Chromium (+6)	N	1.6E+01	1.1E+01	None	None	1.9E+01	1.4E+01	N/A
Copper	N	4.0E+01	2.4E+01	1.3E+03	None	4.9E+01	3.0E+01	N/A
Lead	N	5.3E+02	5.9E+01	1.5E+01	None	6.3E+02	7.4E+01	N/A
Nickel	N	4.9E+02	5.4E+01	6.1E+02	4.6E+03	5.9E+02	6.8E+01	6.7E+03
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.4E+01	6.3E+00	6.2E+03
Silver	N	2.6E+01	None	None	None	3.1E+01	N/A	N/A
Zinc	N	3.2E+02	3.2E+02	7.4E+03	2.6E+04	3.8E+02	4.0E+02	3.8E+04

PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh}, the WLA_{hh} was imposed as the limit.

Since there are no data available for any toxic pollutants immediately upstream of this discharge, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

A. If all data are reported as "below detection" or < the required Quantification Level (QL), and at least one detection level is ≤ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.

B. If all data are reported as "below detection", and all detection levels are > the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.

B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.

B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.

C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.

C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.

C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.

C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

C.4. (Exception for total sulfide and dissolved sulfide only) If any data value for total sulfide or dissolved sulfide is reported at or above the required QL, then additional monitoring requirements are specified in the draft permit for dissolved sulfide and for hydrogen sulfide.

C.5. (Exception for hydrogen sulfide data only) If the evaluation indicates that limits are needed, then a requirement to submit a Hydrogen Sulfide Minimization Plan for approval no later than 90 days following the effective date of the permit is specified in the draft permit.

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Antimony, dissolved	7440-36-0	0.2	<5	b	B.1
Arsenic, dissolved	7440-38-2	1.0	<5	b	B.1
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	<0.5	b	B.1
Chromium III, dissolved	16065-83-1	0.5	<3	b	B.1
Chromium VI, dissolved	18540-29-9	0.5	<3	b	B.1
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	4	b	C.1
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	<5	b	B.1
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	<0.2	b	A
Nickel, dissolved	7440-02-0	0.5	5	b	C.1
Selenium, total recoverable	7782-49-2	2.0	<2.5	b	B.1
Silver, dissolved	7440-22-4	0.2	<1	b	B.1
Thallium, dissolved	7440-28-0	---	<5	b	A
Zinc, dissolved	7440-66-6	2.0	28	b	C.1
PESTICIDES/PCBS					
Aldrin [C]	309-00-2	0.05	<0.05	b	A
Chlordane [C]	57-74-9	0.2	<0.2	b	A
Chlorpyrifos	2921-88-2	---	<0.2	b	A
DDD [C]	72-54-8	0.1	<0.05	b	A
DDE [C]	72-55-9	0.1	<0.05	b	A
DDT [C]	50-29-3	0.1	<0.05	b	A
Demeton	8065-48-3	---	<1	b	A
Diazinon	333-41-5	---	<1	b	A
Dieldrin [C]	60-57-1	0.1	<0.05	b	A
Alpha-Endosulfan	959-98-8	0.1	<0.05	b	A
Beta-Endosulfan	33213-65-9	0.1	<0.05	b	A
Alpha-Endosulfan + Beta-Endosulfan		---	<0.1	b	A
Endosulfan Sulfate	1031-07-8	0.1	<0.05	b	A
Endrin	72-20-8	0.1	<0.05	b	A
Endrin Aldehyde	7421-93-4	---	<0.05	b	A
Guthion	86-50-0	---	<1	b	A
Heptachlor [C]	76-44-8	0.05	<0.05	b	A
Heptachlor Epoxide [C]	1024-57-3	---	<0.05	b	A
Hexachlorocyclohexane Alpha-BHC [C]	319-84-6	---	<0.05	b	A
Hexachlorocyclohexane Beta-BHC [C]	319-85-7	---	<0.05	b	A
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	<0.05	b	A
Kepone	143-50-0	---	<5	b	A
Malathion	121-75-5	---	<1	b	A
Methoxychlor	72-43-5	---	<0.05	b	A

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Mirex	2385-85-5	---	<0.05	b	A
Parathion	56-38-2	---	<1	b	A
PCB Total [C]	1336-36-3	7.0	<0.5	b	A
Toxaphene [C]	8001-35-2	5.0	<0.5	b	A
BASE NEUTRAL EXTRACTABLES					
Acenaphthene	83-32-9	10.0	<5	b	A
Anthracene	120-12-7	10.0	<5	b	A
Benzidine [C]	92-87-5	---	<5	b	A
Benzo (a) anthracene [C]	56-55-3	10.0	<5	b	A
Benzo (b) fluoranthene [C]	205-99-2	10.0	<5	b	A
Benzo (k) fluoranthene [C]	207-08-9	10.0	<5	b	A
Benzo (a) pyrene [C]	50-32-8	10.0	<5	b	A
Bis 2-Chloroethyl Ether [C]	111-44-4	---	<5	b	A
Bis 2-Chloroisopropyl Ether	108-60-1	---	<5	b	A
Bis-2-Ethylhexyl Phthalate [C]	117-81-7	10.0	<5	b	A
Butyl benzyl phthalate	85-68-7	10.0	<5	b	A
2-Chloronaphthalene	91-58-7	---	<5	b	A
Chrysene [C]	218-01-9	10.0	<5	b	A
Dibenz(a,h)anthracene [C]	53-70-3	20.0	<5	b	A
1,2-Dichlorobenzene	95-50-1	10.0	<5	b	A
1,3-Dichlorobenzene	541-73-1	10.0	<5	b	A
1,4-Dichlorobenzene	106-46-7	10.0	<5	b	A
3,3-Dichlorobenzidine [C]	91-94-1	---	<5	b	A
Diethyl phthalate	84-66-2	10.0	<5	b	A
Dimethyl phthalate	131-11-3	---	<5	b	A
Di-n-Butyl Phthalate	84-74-2	10.0	No data available. Needs to be sampled.		
2,4-Dinitrotoluene	121-14-2	10.0	<5	b	A
1,2-Diphenylhydrazine [C]	122-66-7	---	<5	b	A
Fluoranthene	206-44-0	10.0	<5	b	A
Fluorene	86-73-7	10.0	<5	b	A
Hexachlorobenzene [C]	118-74-1	---	<5	b	A
Hexachlorobutadiene [C]	87-68-3	---	<5	b	A
Hexachlorocyclopentadiene	77-47-4	---	<5	b	A
Hexachloroethane [C]	67-72-1	---	<5	b	A
Indeno(1,2,3-cd)pyrene [C]	193-39-5	20.0	<5	b	A
Isophorone [C]	78-59-1	10.0	<5	b	A
Nitrobenzene	98-95-3	10.0	<5	b	A
N-Nitrosodimethylamine [C]	62-75-9	---	<5	b	A
N-Nitrosodi-n-propylamine [C]	621-64-7	---	<5	b	A
N-Nitrosodiphenylamine [C]	86-30-6	---	<5	b	A
Pyrene	129-00-0	10.0	<5	b	A
1,2,4-Trichlorobenzene	120-82-1	10.0	<5	b	A

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
VOLATILES					
Acrolein	107-02-8	---	<50	b	A
Acrylonitrile [C]	107-13-1	---	<50	b	A
Benzene [C]	71-43-2	10.0	<5	b	A
Bromoform [C]	75-25-2	10.0	<5	b	A
Carbon Tetrachloride [C]	56-23-5	10.0	<5	b	A
Chlorobenzene	108-90-7	50.0	<5	b	A
Chlorodibromomethane [C]	124-48-1	10.0	<5	b	A
Chloroform	67-66-3	10.0	<5	b	A
Dichlorobromomethane [C]	75-27-4	10.0	<5	b	A
1,2-Dichloroethane [C]	107-06-2	10.0	<5	b	A
1,1-Dichloroethylene	75-35-4	10.0	<5	b	A
1,2-trans-dichloroethylene	156-60-5	---	<5	b	A
1,2-Dichloropropane [C]	78-87-5	---	<5	b	A
1,3-Dichloropropene [C]	542-75-6	---	<5	b	A
Ethylbenzene	100-41-4	10.0	<5	b	A
Methyl Bromide	74-83-9	---	<10	b	A
Methylene Chloride [C]	75-09-2	20.0	<5	b	A
1,1,2,2-Tetrachloroethane [C]	79-34-5	---	<5	b	A
Tetrachloroethylene	127-18-4	10.0	<5	b	A
Toluene	10-88-3	10.0	<5	b	A
1,1,2-Trichloroethane [C]	79-00-5	---	<5	b	A
Trichloroethylene [C]	79-01-6	10.0	<5	b	A
Vinyl Chloride [C]	75-01-4	10.0	<10	b	A
RADIONUCLIDES					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
ACID EXTRACTABLES					
2-Chlorophenol	95-57-8	10.0	<5	b	A
2,4-Dichlorophenol	120-83-2	10.0	<5	b	A
2,4-Dimethylphenol	105-67-9	10.0	<5	b	A
2,4-Dinitrophenol	51-28-5	---	<20	b	A
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<5	b	A
Nonylphenol	104-40-51	---	<5	b	A
Pentachlorophenol [C]	87-86-5	50.0	<10	b	A
Phenol	108-95-2	10.0	<5	b	A
2,4,6-Trichlorophenol [C]	88-06-2	10.0	<5	b	A
MISCELLANEOUS					
Ammonia-N (mg/L) (Annual) (Jul-Sep)	766-41-7	0.2 mg/L	Default = 9 mg/L	a	C.2
Ammonia-N (mg/L) (Wet Season) (Oct-Jun)	766-41-7	0.2 mg/L	Default = 9 mg/L	a	C.2

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Chloride (mg/L)	16887-00-6	---	258, 258, 251, 239, 280, 267, 278, 230, 304, 186, 246	c	C.2
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	a	C.2
Cyanide, Free	57-12-5	10.0	<5	b	A
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)(ppq)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Sulfide, dissolved	18496-25-8	100	No data available. Needs to be sampled.		
Hydrogen Sulfide	7783064	---	<25	b	A
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	<0.03	b	A
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Hardness (mg/L as $CaCO_3$)	471-34-1	---	333	b	---

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5}.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

"Source of Data" codes:
a = default effluent concentration
b = data from permittee monitoring; April 2011
c = data from permittee monitoring; Mar-May 2015. Data previous to this were not used in the evaluation since the source of chloride is the Ferric Chloride used for phosphorus removal, and the automatic controls of the plant were reprogrammed by the manufacturer in 2015 to optimize nutrient removal and reduce cost.

"Data Evaluation" codes:
See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

STAT.EXE RESULTS

Ammonia-N (Jun-Dec)	**Ammonia-N (Jan-May)**	**TRC**
Chronic averaging period = 30 WLAa = 6.3 WLAc = 2 Q.L. = 0.2 # samples/mo. = 4 * # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 4.03534018683262 Average Weekly limit = 4.03534018683262 Average Monthly Limit = 2.75906588218996 The data are: 9 *Baseline sampling frequency of 1/week used for limit evaluation	Chronic averaging period = 30 WLAa = 8.7 WLAc = 4.8 Q.L. = 0.2 # samples/mo. = 4 * # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Acute Toxicity Maximum Daily Limit = 8.7 Average Weekly limit = 8.7 Average Monthly Limit = 5.94841378017587 The data are: 9 *Baseline sampling frequency of 1/week used for limit evaluation	Chronic averaging period = 4 WLAa = 0.023 WLAc = 0.014 Q.L. = 0.1 # samples/mo. = 90 # samples/wk. = 21 Summary of Statistics: # observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.04760469767452E-02 Average Weekly limit = 1.06620981902841E-02 Average Monthly Limit = 9.41555541655423E-03 The data are: 20

Arsenic, Dissolved	**Cadmium**	**Chloride**
Chronic averaging period = 4 WLAa = 410 WLAc = 190 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 5	Chronic averaging period = 4 WLAa = 18 WLAc = 3.5 Q.L. = 0.3 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = .5 Variance = .09 C.V. = 0.6 97th percentile daily values = 1.21670 97th percentile 4 day average = .831895 97th percentile 30 day average= .603026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 0.5	Chronic averaging period = 4 WLAa = 1000 WLAc = 290 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 11 Expected Value = 254.540 Variance = 1073.43 C.V. = 0.128715 97th percentile daily values = 321.296 97th percentile 4 day average = 286.668 97th percentile 30 day average= 265.792 # < Q.L. = 0 Model used = lognormal No Limit is required for this material The data are: 258, 258, 251, 239, 280, 267, 278, 230, 304, 186, 246

Chromium III, Dissolved Chronic averaging period = 4 WLAa = 1800 WLAc = 240 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 3 Variance = 3.24 C.V. = 0.6 97th percentile daily values = 7.30025 97th percentile 4 day average = 4.99137 97th percentile 30 day average= 3.61815 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 3	**Chromium VI, Dissolved** Chronic averaging period = 4 WLAa = 19 WLAc = 14 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 3 Variance = 3.24 C.V. = 0.6 97th percentile daily values = 7.30025 97th percentile 4 day average = 4.99137 97th percentile 30 day average= 3.61815 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 3	**Copper, Dissolved** Chronic averaging period = 4 WLAa = 49 WLAc = 30 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 4 Variance = 5.76 C.V. = 0.6 97th percentile daily values = 9.73367 97th percentile 4 day average = 6.65516 97th percentile 30 day average= 4.82421 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 4

Lead, Dissolved Chronic averaging period = 4 WLAa = 630 WLAc = 74 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 5	**Nickel, Dissolved** Chronic averaging period = 4 WLAa = 590 WLAc = 68 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 5 Variance = 9 C.V. = 0.6 97th percentile daily values = 12.1670 97th percentile 4 day average = 8.31895 97th percentile 30 day average= 6.03026 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 5	**Selenium, Dissolved** Chronic averaging period = 4 WLAa = 24 WLAc = 6.3 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 2.5 Variance = 2.25 C.V. = 0.6 97th percentile daily values = 6.08354 97th percentile 4 day average = 4.15947 97th percentile 30 day average= 3.01513 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 2.5

Silver, Dissolved Chronic averaging period = 4 WLAa = 31 WLAc = Q.L. = 0.2 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 1 Variance = .36 C.V. = 0.6 97th percentile daily values = 2.43341 97th percentile 4 day average = 1.66379 97th percentile 30 day average= 1.20605 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 1	**Zinc, Dissolved** Chronic averaging period = 4 WLAa = 380 WLAc = 400 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 1 Expected Value = 28 Variance = 282.24 C.V. = 0.6 97th percentile daily values = 68.1356 97th percentile 4 day average = 46.5861 97th percentile 30 day average= 33.7694 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data No Limit is required for this material The data are: 28	

APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page	• Content and format as prescribed by the Guidance Memo No. 14-2003. • The city reference was removed.
Part I.A.1	**Effluent Limitations and Monitoring Requirements:** Bases for effluent limits and monitoring requirements provided in previous pages of fact sheet. *Updates Part I.A.1 of the previous permit with the following:* • More stringent limits for $CBOD_5$ (Jan-May) were included. • Less stringent Ammonia-N limits were included. • Chloride monitoring was added. • A footnote was added for parameters with reduced monitoring referring to a special condition regarding reinstatement of baseline monitoring. • The monitoring frequency for Ammonia-N and $CBOD_5$ was decreased from 1/Week to 1/2 Months based on Guidance Memo No. 14-2003. • Nitrate plus Nitrite, TKN, TN, and TP monitoring were removed since they are reported under the permittee's VPDES GP coverage (VAN010107).
Part I.B	**Total Residual Chlorine (TRC) and E. coli Limitations and Monitoring Requirements:** *Updates Part I.B of the previous permit with slightly more stringent limits and minor wording changes.* Specifies both disinfection and effluent limits and monitoring requirements should the permittee elect to switch from alternate disinfection to chlorine disinfection. Required by Sewage Collection and Treatment (SCAT) Regulations and 9VAC25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.
Part I.C	**Effluent Limitations and Monitoring Requirements – Additional Instructions***: Updates Part I.C. of the previous permit with minor wording changes. Also, the QL for $CBOD_5$ was changed from 5 mg/L to 2 mg/L.* Authorized by VPDES Permit Regulation 9 VAC25-31-190 J.4 and 220.I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. §62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.
Part I.D	**Pretreatment Program Requirements:** *Updates Part I.D of the previous permit with minor wording changes.* An industrial waste survey must be submitted within 180 days of the effective date of the permit. VPDES Permit Regulation 9VAC25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.

Part I.E.1	**95% Capacity Reopener:** *Updates Part I.E.1 of the previous permit with minor wording changes*. Required by VPDES Permit Regulation 9VAC25-31-200 B 4 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) permits.
Part I.E.2	**Indirect Dischargers:** *Identical to Part I.E.2 of the previous permit.* Required by VPDES Permit Regulation 9VAC25-31-200.B.1 and B.2 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) that receive waste from someone other than the owner of the treatment works.
Part I.E.3	**Materials Handling/Storage:** *Updates Part I.E.3 of the previous permit with minor wording changes.* 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.
Part I.E.4	**O&M Manual Requirement:** *Updates Part I.E.4 of the previous permit with changes to what is required to be included in the O&M Manual.* Required by Code of Virginia Section 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.E.5	**CTC/CTO Requirement:** *Identical to Part I.C.5 of the previous permit.* Required by Code of Virginia 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.E.6	**SMP Requirement:** *Identical to Part I.E.6 of the previous permit.* VPDES Permit Regulation 9VAC25-31-100.Q, 220.B.2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9VAC25-32-10 *et seq.*)
Part I.E.7	**Licensed Operator Requirement:** *Updates Part I.E.7 of the previous permit with minor wording changes.* The VPDES Permit Regulation 9VAC25-31-200.C, the Code of Virginia 54.1-2300 et seq., and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.), require licensure of operators. A class III license is indicated for this facility.
Part I.E.8	**Reliability Class:** *Identical to Part I.E.8 of the previous permit with minor wording changes.* Required by Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790 for all municipal facilities.
Part I.E.9	**Water Quality Criteria Monitoring:** *Updates Part I.E.9 of the previous permit with minor wording changes.* State Water Control Law Section 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.
Part I.E.10	**Treatment Works Closure Plan**. *Updates Part I.E.10 of the previous permit with minor wording changes*. This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure industrial sites and treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the State Water Control Law.

Part I.E.11	**Reopeners:** a. *Identical to Part I.E.11.a of the previous permit:* Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. b. *Identical to Part I.E.11.b of the previous permit:* 9VAC25-40-70.A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. c. *Updates Part I.E.11.c of the previous permit with minor wording changes:* 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards. d. *Identical to Part I.E.11.d of the previous permit:* Required by the VPDES Permit Regulation 9VAC25-31-220.C, for all permits issued to treatment works treating domestic sewage.
Part I.E.12	**Suspension of concentration limits for E3/E4 facilities:** *Updates Part I.E.12 of the previous permit with minor wording changes.* 9VAC25-40-70.B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
Part I.E.13	**Effluent Monitoring Frequencies:** *New Requirement.* In accordance with Guidance Memo No. 14-2003, a reduction in monitoring frequency has been granted based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limits for which reduced frequencies were granted. If the permittee fails to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.
Part II	**Conditions Applicable to All VPDES permits:** *Updates Part II of the previous permit.* VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.